

***Operable Unit 7-08 Estimate
of a Tortuosity Factor
for Gas Diffusion
in Overburden Soil
in the Subsurface Disposal
Area***

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*Idaho National Engineering and Environmental Laboratory
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Approved by



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ABSTRACT

This document presents the results of a study to estimate the tortuosity of overburden soil of the Subsurface Disposal Area (SDA), which is located in the Radioactive Waste Management Complex at the Idaho National Engineering and Environmental Laboratory. Tortuosity factors, which are unitless values, are calculated from field data and compared to tortuosity values obtained from theoretical and empirical formulas. Carbon dioxide was the tracer gas chosen for this study because it is a common gas that is widely distributed, and because CO₂ concentrations are easily tracked in real time using infrared sensors.

The determination of a site-specific tortuosity factor for soil in the SDA provided results consistent with existing theoretical and empirical equations. The range of mean values for the tortuosity factor for each deployment location in the SDA was determined to be 2.8 to 4.6, while empirical and theoretical equations produced a range of 2.5 to 4.6.

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ACRONYMS

EPA	U.S. Environmental Protection Agency
INEEEL	Idaho National Engineering and Environmental Laboratory
SDA	Subsurface Disposal Area
RWMC	Radioactive Waste Management Complex
VOC	volatile organic compound

